

Vol. XI. No. 1.

January 15, 1914

THE
PSYCHOLOGICAL BULLETIN

GENERAL REVIEWS AND SUMMARIES

GENERAL PROBLEMS; MIND AND BODY

BY WALTER T. MARVIN
Rutgers College

The most prominent subject in the current discussion of the foundations of psychology is the formulation and limitation of the psychologist's problem. Is psychology purely a study of behavior, or is it solely a study of mental states and processes, or does its problem lead to research in both fields? Probably the majority of psychologists, especially of American psychologists, reply that both types of research are properly psychological; but there remain two able and energetic minorities who take respectively the extreme standpoints. Of these the behaviorists especially are attracting attention. In two articles Watson (17) (18) states and defends their doctrine most explicitly; and perhaps nowhere is there to be found a clearer and briefer formulation of their doctrine than in his introductory paragraph to the first of these two articles. "Psychology as the behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, nor is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness. The behaviorist, in his efforts to get a unitary scheme of animal response, recognizes no dividing line between man and brute. The behavior of man with all of its refinement and complexity, forms only a part of the behaviorist's total scheme of investigation." He attacks current psychology directly as having "failed to make good its claim as a natural science. Due to a mistaken notion that its fields of facts are conscious phenomena and that introspec-

tion is the only direct method of ascertaining these facts, it has enmeshed itself in a series of speculative questions which, while fundamental to its present tenets, are not open to experimental treatment." On the other hand, the science of behavior will "have to neglect but few of the really essential problems with which psychology as an introspective science now concerns itself." Angell's two articles (2) (3) bear directly upon Watson's argument, although the former was written before Angell had read Watson's first article. Though heartily in sympathy with the behaviorist in his constructive views and though agreeing "that in theory all and in practice much of our mental life might be stated in terms of objective behavior," Angell points out that introspection affords information not to be gained elsewhere. As a result it is futile to discard it. "Refine it, check it, train it, but do not throw away a good tool until you certainly have a better in hand. And do not forget that in much which offers itself as objective method, introspection is really involved either directly or indirectly."

Related to the views of Watson but reached by different ways are the views of Singer, Woodbridge and Perry. Singer (15) returns to the topic of an earlier article bearing the same title and answers especially a question put to the behaviorist by Miss Washburn, "What are you going to do with a being who thinks, but who exhibits no behavior for the very reason that he thinks? What are you going to do with the passive, the utterly passive thinker?" Woodbridge (20) finds the present theoretical confusion in psychology to be due chiefly to one unfortunate preconception. "This preconception consists of the very current belief that there are such things as 'sensations' which form a kind of elementary component of a stream of consciousness or of a mind." The discussions of "introspection" indicate that the method of introspection is really neither an important nor a genuine method of psychology. Indeed if we turn from this and similar discussions regarding the epistemological foundations of psychology and inquire regarding the actual performances and achievements of psychologists we find that behavior and not consciousness is "the thing which the psychologist does, as a matter of fact, investigate. To my own mind the psychologists who have used the concept of behavior rigidly have passed at once from theoretical confusion to theoretical clearness." In his recent book Perry (14) includes a chapter entitled *A Realistic Theory of Mind*. In this he discusses two major subjects, the method of introspection and the method of general observation. Introspection does not reveal

a manifold in itself either "peculiarly mental" or "peculiarly mine." Rather the elements of this manifold are "neutral and interchangeable." It is on the contrary in their grouping and interrelations that these "elements of mental content exhibit their peculiarity." But what are these groupings and interrelations? The answer will not be found "until we abandon the introspective method and view mind as it operates in the open field of nature and history." And this is no less true if the content derives its mental character from mental action, for "the nature of mental action is discoverable neither by an analysis of mental contents nor by self-intuition." If we employ general observation we learn that "elements become mental content when reacted to in the specific manner characteristic of the central nervous system," and since the action of the nervous system, like the organism, exhibits "the control of interests, we must add to our physiological account of the action of the mind a moral account." Thus Perry draws the conclusion: The content of mind "is that portion of the environment which is taken account of by the organism in serving its interests." Otherwise expressed, "as mind appears in nature and society, it consists primarily of interested behavior." Adams' article (1) is concerned in general with the realistic psychology of James, Woodbridge, and Perry. He believes that both absolute idealism and the new realism discard as illusory or as confused and valueless all introspective reports about conscious processes, and that they both defend a relational theory of consciousness. In particular, Adams defends the belief that there is a non-observable mental activity. Realism presupposes wrongly that "everything real can be *found to exist*," that is, can be observed; whereas the solution of the problem of mind seems to require "the conception of consciousness as possessing a character, a dimension, which does not fit entirely and without remainder into *any* complex of objectively found or findable entities." This non-objective dimension of mind is to be identified "with activity in some sense." For example, feeling and the consciousness of meaning are not describable as facts "on a level with presentations and describable contents."

The extreme position of the behaviorist and realist in America seems as yet to have called forth no marked response from European psychologists and philosophers. The issue with them seems to lie rather between the extreme introspectionist and the upholder of both types of research. Anschütz (4) defends experimental and objective psychological research against the extreme position of

Lipps, that psychology is the observation of one's own mental life. He claims that psychology cannot be divorced completely from philosophy (as Külpe has urged) because psychological problems lead the psychologist directly to philosophical ones and because philosophy in its turn is directly dependent upon psychological doctrine. Krueger (9) writes: "natural science must construct a conceptual system of *objective* reality, *as if* it were quite independent of any individual's consciousness." Psychology, on the contrary, is obliged to complement this conscious one-sidedness. "And though psychology, like natural science, is a law-seeking science, it cannot reach its goal so directly and so immediately, for it must include also a genetic theory of civilization." In short, it is "confederated not only with the natural, but also, potentially at least, with the humanistic sciences." Souriau (16) finds the older delimitations of the field of psychology (*e. g.*, the non-spatiality of the mental, the privacy of the mental, and so forth) quite inadequate and false. The mental differentiates itself from the physical by being teleological.

The general problem of the evolution of mental life is studied in a book of great importance by Morgan (11). The discontinuity observable everywhere in physical, biological and psychological evolution alongside of the demonstrable continuity of parts and their special functions seems explicable only on the assumption that the whole is really more than the mere sum of its parts taken in isolation. That is, the combination of parts as such introduces new characteristics or properties. Hence arise the new properties which come in chemical synthesis, hence the new characteristics which differentiate the living from the lifeless. Hence come those new characteristics which, arising in the course of biological evolution, we call instinct and consciousness. Conversely, to start with the highly complex organism and explain it by assuming in the simpler organism all its characteristics is futile. For example, this is what the panpsychist naïvely does, since he accounts for the origin of mind by assuming that the organisms which we know to have consciousness must have evolved from organisms that already were conscious! Related to Morgan's problem is that of Jacks (8). He attacks the method (*e. g.*, of Caird) of explaining the evolution of consciousness by representing the mind to begin with "as neither totally unconscious nor completely conscious of the ends to be evolved. A doctrine of betwixt and between is set up, according to which the mind, along with a clear consciousness of the stage already reached, has a dim consciousness of the stages to come." It is the psycholo-

gist's fallacy. It treats "a consciousness of what is dim as though it were a dim consciousness of what is clear, a consciousness of an evolving world as though it were the evolving consciousness of a world."

Ogden's presidential address (13) in part discusses the relation of psychology to philosophy. In particular, he regrets the tendency present in the new realism to divorce completely philosophy from psychology. He believes that the results of recent research in the field of thought processes bears directly upon the solution of philosophical problems including the issue between realism and idealism. In general, he believes that psychology can be made "a peculiarly fitting propædeutic to the problems which modern philosophy has before it." To make psychology such would be to revive for psychology "something of that prestige which was accorded it in the preëxperimental days of the British empiricists."

McDougall's book, *Body and Mind*, seems to have led to a renewed interest in the problem having this name. An important paper by Nunn (12) analyzes the bearing of the principle, the conservation of energy, upon the relation between mind and body. He examines briefly the historical development of the principle and shows "that the principle has appeared historically in three phases or forms, so different from one another that every argument which assumes the truth of the principle must be ambiguous without a specification of the form intended. The three forms may be called respectively the mechanistic, the physical, and the 'energetics' phase." This last phase (e. g., Ostwald, Duhem) "is simply irrelevant to the question whether interactionism is or is not an admissible psychological theory," and it is the phase of most importance to psychology. Latta (10) urges against McDougall that there is no entirely independent system of either matter or mind except in abstraction. These abstractions are not realities. Mechanical parallelism presupposes that they are, and is rightly rejected by McDougall. But McDougall does not see that that complex concrete entity, both mind and body, should be interpreted on the basis of observed fact leaving the metaphysical problems open. Watt (19) defends parallelism in its broad view against McDougall's book. Fusion has a neural correlate. For example, Watt urges, "it seems possible to correlate completely the complex unity of binocular vision, fused according to the particular laws of psychical fusion, with the complex physical unity of binocular stimulation and response, co-ordinated according to the particular laws of neural coördination."

Harris (5) argues directly from physiology in favor of interaction. Emotions have physiological effects which must be ascribed to the emotions as such. For example, "one of the latest discoveries in connection with suprarenal capsules is that, in the dog, violent emotion—anger, terror, etc.—can produce a marked increase in the output of the internal secretion of those ductless glands." Similarly, experiments show that emotion is "an absolutely essential link in a chain of neural events with food at one end and a flow of gastric juice at the other." Heymans' paper (6) is also one of the group called forth by McDougall's book. He defends "psychical monism," believing that this postulate would explain all that McDougall believes animism enables us to explain. In particular, he argues, first, that psychical monism is not a metaphysical but a genuinely empirical hypothesis, second, that McDougall's objections to it are not well founded, and, third, that it is better fitted than is animism to explain the alleged facts of psychical research. Finally, Horn (7) in a long and elaborate article reaches the conclusion already drawn, as he points out, by Hartmann, Benno Erdmann, and others, that the problem of the relation between mind and body is to be solved by assuming a phenomenalist dualism based upon a monistic but unknowable ground underlying these phenomena. "Psychical causality remains a postulate, a logical demand of our thought precisely as is the mechanistic causal-nexus. An intuition, or a perception of it, is out of the question. At best it can be inferred or deduced." That is to say, it is at least probable that there is a genuinely psychical, as well as physical, causation. In short, Horn's view of psychical causation results in a double aspect theory that is practically a thoroughgoing parallelism.

REFERENCES

1. ADAMS, G. P. Mind as Form and as Activity. *Phil. Rev.*, 1913, 22, 265-283.
2. ANGELL, J. R. Behavior as a Category of Psychology. *Psychol. Rev.*, 1913, 20, 255-270.
3. ANGELL, J. R. Professor Watson and the Image. *J. of Phil., Psychol., etc.*, 1913, 10, 609.
4. ANSCHÜTZ, G. Spekulative, exakte, und angewandte Psychologie: Eine Untersuchung über die Prinzipien der psychologischen Erkenntniss. *Arch. f. d. ges. Psychol.*, 1912, 23, 281-309; 24, 1-30, 111-140.
5. HARRIS, D. F. Consciousness as a Cause of Neural Activity. *Hibbert J.*, 1913, 11, 378-393.
6. HEYMANS, G. In Sachen des psychischen Monismus. *Zsch. f. Psychol.*, 1912, 63, 241-285.
7. HORN, R. Psychische Kausalität. *Vjsch. f. wiss. Phil.*, 1912, 36, 322-380; 1913, 37, 1-66, 169-233, 345-370.

8. JACKS, L. P. Does Consciousness "evolve"? *Hibbert J.*, 1913, 11, 521-543.
(Abstract of this paper, *Proc. Aristot. Soc.*, 1913, 13, 190-191.)
9. KRUEGER, F. New Aims and Tendencies in Psychology. *Phil. Rev.*, 1913, 22, 251-264.
10. LATTA, R. The Relation of Mind and Body. I. *Brit. J. of Psychol.*, 1912, 5, 280-291.
11. MORGAN, C. L. *Instinct and Experience*. New York: Macmillan; London: Methuen, 1912. Pp. xviii + 299.
12. NUNN, T. P. Animism and the Doctrine of Energy. *Proc. Aristot. Soc.*, 1912, 12, 25-64.
13. OGDEN, R. M. The Relation of Psychology to Philosophy and Education. *Psychol. Rev.*, 1913, 20, 179-193.
14. PERRY, R. B. *Present Philosophical Tendencies*. New York, London: Longmans, Green, 1912. Pp. xv + 383.
15. SINGER, E. A., JR. On Mind as an Observable Object. *J. of Phil., Psychol., etc.*, 1912, 9, 206-214.
16. SOURIAU, P. La délimitation de la psychologie. *Année psychol.*, 1912, 18, 121-144.
17. WATSON, J. B. Psychology as the Behaviorist Views It. *Psychol. Rev.*, 1913, 20, 158-177.
18. WATSON, J. B. Image and Affection in Behavior. *J. of Phil., Psychol., etc.*, 1913, 10, 421-428.
19. WATT, H. J. The Relation of Mind and Body. II. *Brit. J. of Psychol.*, 1912, 5, 292-307.
20. WOODBRIDGE, F. J. E. The Belief in Sensations. *J. of Phil., Psychol., etc.*, 1913, 10, 599-608.

CONSCIOUSNESS AND THE UNCONSCIOUS

BY H. W. CHASE

University of North Carolina

Is the term "consciousness," like the term "soul," to fall into disuse? The philosophers, as Angell (1) reminds us, "have been for a long time pointing out the spurious character of its claim to an unique position in the universe." Bode (2) roundly asserts that "the doctrine that consciousness is a peculiar kind of existence, alongside of, yet 'separated by the whole diameter of being' from physical reality, is rapidly passing into history."

However doubtful the philosopher may be as to the unique nature of consciousness, he is none the less persistent in his efforts to define the term. Bode, in the paper just quoted, holds that definitions of consciousness must neglect neither behavior nor the object with which behavior is correlated. Consciousness for him is to be identified with James' "fringe," provided this is considered as a "total

character" with which behavior is correlated, a total character "which is in the nature of a reference or relationship that faces the future." Fite (4), on the other hand, identifies consciousness with apperception, "or, in James' figure, with the focus rather than the fringe." But, since consciousness is a matter of degree, the fringe must not be altogether excluded.

Boodin (3) takes issue with the assumption that minds are isolated, only to be known through analogy. Mechanical theories have been obstacles in the way of a more correct conception of consciousness. We now know, however, of one type of energy—electrical—which is not material, and to which molecular theories cannot be applied. The concept of mind, likewise, must be set free from physical analogies. "As electrical energy rides on material energy . . . so we may conceive that mental energy rides on electrical energy and yet establishes its own immediately intuited continuities." In our own bodies, it travels on the electrical energy of the nervous system; why not then on "the material vehicles with which our nervous system is continuous"? We must think of mind as "a field of energy with its vague penumbral edges or spreadings and its more or less focalized and shifting center of activity." This conception he applies to the study of the social mind.

The philosopher, whatever his desire to change the sense in which the term consciousness is used, still feels a deep respect for the term itself. Not so Watson. "The time seems to have come," he says (9), "when psychology must discard all reference to consciousness; when it need no longer delude itself into thinking that it is making mental states the object of its observation." Enmeshed in such studies, psychology has failed to make good its claims as a natural science. Its present state is "chaotic." The way out is of course to give up the study of consciousness; "never use the terms consciousness, mental states, mind, content, introspectively verifiable, imagery, and the like." Psychology will then become in a real sense the science of behavior. In a later article (10) the same point of view is reasserted and further developed, with especial reference to current doctrines of imagery and affection.

Angell (1) marks out a compromise position. While sympathetic with the increasing emphasis on the objective study of behavior, he feels that psychology is in no position to dispense with the study of consciousness. Our concepts of consciousness have indeed been at once too specific and too vague, and have led to endless confusion. But "after all is said and done, something corresponding to con-

sciousness in its vague common meaning does exist and it is within its compass that the problems of science arise." We must then take care that in seeking better means of knowing human nature in its entirety "we do not in effect commit the crowning absurdity of seeming to deny any practical significance to that which is its chief distinction."

Loewenfeld's (6) discussion of the subconscious I have already reviewed.¹ It need only be said here that his book is built on the usual lines of the treatises advocating a psychic conception of the subconscious. Stewart's treatment of the problem (8) is also conventional.

Ribot (7) strikes out a somewhat new line. Every state of consciousness, he argues, contains as its stable portion, its "skeleton," a group of kinæsthetic elements. This thesis he defends in some detail by a consideration of mental processes: perception, association, the image, attitudes. On the affective side of consciousness, motor elements are likewise essential.

This conception is utilized for a discussion of the nature of the unconscious, as distinguished from the sub-(co)conscious. We are nowhere told, however, how the two are to be differentiated. The unconscious must not be conceived as a thinking, cognitive reality. This is to ascribe to it qualities which are of the essence of consciousness itself. Nor can it be conceived in terms of feeling; feeling is meaningless without its basal motor tendencies. What then remains? Simply motor tendencies, and in terms of these must the unconscious be described. It is "a mass of kinæsthetic residues, isolated, grouped, associated according to the past experience of the individual, empty of content, but capable of reinstatement as content of consciousness." While the field of consciousness is necessarily narrow, that of the unconscious is not. Processes of entirely different characters may go on simultaneously. Activity here proceeds by leaps and bounds; it is not subject to the methodological rules of reflective thought; processes may interfere, check each other, sometimes work out new conclusions, as in the oft-quoted cases of unconscious creativeness. Structurally, then, the unconscious is composed of psychic residues, once in consciousness. Functionally, it differs from consciousness especially in its lack of order and unity. And, finally, its mission is to accumulate energy which is expended by consciousness.

Jung (5), stressing the importance of the psychic activities that transpire in the unconscious, points to the sudden outbreak of com-

¹This journal for November, 1913.

plicated systems of delusions as evidence of the reality of its work. In general, his doctrine of the unconscious is that of the orthodox Freudian school, from which in many other points he seems to be breaking away. He would, however, make the motive force which finds expression in both conscious and unconscious activities, a unitary stream of psychic energy, the libido, which is thus broadened from its sexual meaning to one almost synonymous with interest, as Claparède suggests. As in all the Freudian literature, the importance of unconscious wishes and forces in both health and disease is insisted on.

REFERENCES

1. ANCELL, J. R. Behavior as a Category of Psychology. *Psychol. Rev.*, 1913, 20, 255-270.
2. BODE, B. H. The Definition of Consciousness. *J. of Phil., Psychol., etc.*, 1913, 10, 232-238.
3. BODIN, J. E. Individual and Social Minds. *J. of Phil., Psychol., etc.*, 1913, 10, 169-180.
4. FITE, WARNER. The Social Implications of Consciousness. *J. of Phil., Psychol., etc.*, 1913, 10, 365-373.
5. JUNG, C. G. Versuch einer Darstellung der psychoanalytischen Theorie. *Jahrb. f. psychoanal. u. psychopathol. Forsch.*, 1913, 5, 307-441.
6. LOEWENFELD, L. *Bewusstsein und psychisches Geschehen*. Weisbaden: Bergmann, 1913. Pp. vi + 94.
7. RIBOT, TH. *La vie inconsciente et les mouvements*. Paris: Alcan, 1913. Pp. 172.
8. STEWART, H. L. *Questions of the Day in Philosophy and Psychology*. New York: Longmans, 1912. Pp. ix + 284.
9. WATSON, J. B. Psychology as the Behaviorist Views It. *Psychol. Rev.*, 1913, 20, 158-177.
10. WATSON, J. B. Image and Affection in Behavior. *J. of Phil., Psychol., etc.*, 1913, 10, 421-427.

TERMINOLOGY

BY HOWARD C. WARREN

Princeton University

Ruckmich (5) has made a comprehensive examination of the meanings given to the term *function* in 15 psychological text-books in English published within twenty years. Aside from the mathematical use he finds four different applications: (I.) Service. (A) The function serves one or more other processes or functions. (B) The function serves the whole organism, (1) defensively; or (2) it is "the expression of an individuality, the assertion of the ego over against its environment" (p. 103). (II.) Activity; function here

implies an "active relation to the organized system: the assigned task of the function is an end in itself" (p. 103). The notion of expressive relation (I., B, 2) is rare. "The majority of writers use the term function in the sense of activity [Class II.]. . . . There is, in addition, an underlying tendency to instill into every other meaning of the word an active principle of some sort" (p. 122). The notion of purpose or end is prominent. "Mental and bodily structures are described from a teleological aspect." Few of the writers examined employ the term with entire consistency.

Grüner (3) notes that the term *psychoanalysis* is comparatively new. It originated with Freud and is not found in any of the dictionaries. The implications of this branch of research make the term more appropriate than *comparative individual psychology* which Adler has recently proposed. The adjective "comparative" conveys too broad an implication, and "individual psychology" is ambiguous. Grüner points out that whereas the older psychology analyzes certain functions of consciousness such as sensation, feeling, etc., and their intensity, quality, etc., psychoanalysis attempts to establish a causal relation among the phenomena of consciousness and to exhibit them as members of a sequence.

Watson (6) and Angell (1) propose independently the word *behaviorist* to denote the behavior psychologist. The science itself is called *behaviorism* by Watson (p. 166). Bechterew (2) uses the term *objective psychology*, which is less descriptive but more fluent. *Behavior psychology* seems preferable to either.

The French philosophical vocabulary edited by Lalande (4) is continued from O to Personnel and includes *Objet*, *Observation*, *Ontogénèse*, *Panpsychisme*, *Parallélisme*, *Paramnésie*, *Parole intérieure*, *Passion*, *Pensée*, *Perception*, and *Personnalité*, which are of interest to psychologists.

REFERENCES

1. ANGELL, J. R. Behavior as a Category of Psychology. *Psychol. Rev.*, 1913, 20, 261.
2. BECHTEREW, W. *Objektive Psychologie*. Leipzig: Teubner, 1913.
3. GRÜNER, F. Inhalt und terminologische Berechtigung des Begriffes Psychoanalyse. *Zentbl. f. Psychoanal.*, 1913, 3, 415-425.
4. LALANDE, A. Vocabulaire philosophique. *Bull. soc. franç. de phil.*, 1912, 12.
5. RUCKMICH, C. A. The Use of the Term *Function* in English Text-Books of Psychology. *Amer. J. of Psychol.*, 1913, 24, 99-123.
6. WATSON, J. B. Psychology as the Behaviorist Views It. *Psychol. Rev.*, 1913, 20, 158-177.

TEXT-BOOKS AND GENERAL TREATISES

BY HERBERT SIDNEY LANGFELD

Harvard University

Several psychological treatises which differ widely as to method and purpose have been published this year. It is a piece of good fortune for all those psychologists who do not read Russian that Bechterew's *Psychologie objective*¹ (2) has recently been translated into French. They can now become acquainted with the views of the famous scientist upon all the important psychological questions and methods of investigation. Bechterew does not believe that psychology should be restricted to a study of facts of consciousness, but that it should include all psychic phenomena, conscious or not, and all facts connected with the psychic life and the biological foundation of their manifestations. As the title suggests, for him there is only one way of approach for a psychology that claims to be a science and that is by the expressive method of investigation. While introspection may serve certain purposes it remains purely subjective and can add nothing to an objective science. This does not debar investigations upon memory, etc., for the author includes the spoken and written words in the reflex arc, the three processes of which are reception, association and reaction. The reader will find, however, no mention of imagery nor any description of the manner in which thought and feeling are represented in consciousness. The author proposes, in order to avoid all misunderstanding, to replace the term psychical phenomenon by neuro-psychical phenomenon. So we find those processes which involve the higher centers spoken of as "réactions neuro-psychiques."

Space does not permit of more than a mere indication of the vast amount of material and of the original manner of its presentation. The book is divided into two parts. In the first the nature of the different processes, the manner of reaction and the physiological condition of the same as well as the central localization of the neuro-psychic reaction are discussed. There are the internal reactions, such as those of the vaso-motor system and the external, such as the motor reactions. The latter are divided into two classes, those favorable and those unfavorable to the organism. Much importance is attached to this distinction throughout the book. The effective states are classified as the positive and negative tone or attitude.

¹ A critical review by Professor J. B. Watson will shortly appear in the BULLETIN.

The last chapters are devoted to the association processes and their anatomical foundations. The second part deals with the reflexes, from the simple reflexes through the instinctive reflexes, the neuro-psychic reflexes, the expressive reflexes and the symbolic reflexes to the reflexes which form the personality of the individual. The subjective description of instinct as an action with no consciousness of goal must be abandoned. Under the name of instinct one understands a reaction which takes place like a reflex but which is determined by the needs of the organism. In the chapter on the neuro-psychic reflexes much space is given to memory investigations and to association experiments. Not only is language, but also the manner and condition of sensory reactions and of sensory thresholds considered under the symbolic reflexes. The latter, it is suggested, may be determined by the associated reflexes. Studies in attention are included under the chapter entitled "Les Réflexes de la concentration nerveuse." Throughout there are numerous descriptions of work done in the author's laboratory, covering almost the entire field of psychology and evidently never before published.

Schmied-Kowarzik's *Analytische Psychologie* (17) is the other extreme from the psychology just mentioned. The author does not oppose the empirical psychology but places the analytical coördinate to it. "General psychology is partly a descriptive science that portrays the causal connections in the psychic and between the psychic and the physical . . . partly a general descriptive and analytical psychology." The use of the word descriptive should not be misleading. The present book is in no wise similar to a descriptive psychology such as Titchener's, from the fact that empirical psychology is not the basis of description. It is strongly emphasized throughout the book that the particular problems involved cannot be solved through empirical experiment and induction. For a clearer idea of the difference between the analytical and empirical psychology analogy is made with the relation of geometry to the natural sciences. It is an arm-chair psychology in the strictest sense, an introspection of one's own consciousness being all sufficient. The adjective "new" in the title refers to the viewpoint and not to the material presented. The method follows that of Hume and Kant and is new in that the analysis is not merely used in a greater or less degree, but becomes the sole aim of the treatise. The book is strongly influenced by the teachings of Wilhelm Dilthey of whom the author is a pupil.

The first quarter of the volume deals with the nature of analysis. Here is found the relation of empirical to analytical knowledge and

an historical development of this distinction, a discussion of analytical psychology as the foundation for all analytical sciences and a description of empirical and analytical methods. Then follows the author's psychological system. The analysis starts with consciousness as a whole and a definition of the ego and the immediate present. Consciousness is then divided into the three elements of reality: sensation, feeling and will. About forty pages are devoted to the nine different classes of sensations, each of which is treated separately. Under vision, for example, quality and intensity are briefly defined and most of the remaining space is devoted to the construction of a color octahedron, which, it might be mentioned, will continue to have very little more than schematic value until empirical science has determined the relation of all its sides. The remainder of the book is devoted to feeling, to will, to space and time perceptions, to a discussion of the opposition of subject and object, to imagery and lastly to the thought processes. It will readily be seen that this is not a book to interest those searching for facts, but rather those interested in artificial construction and epistemological considerations.

Parmelee¹ (12) tells us that in his books he has "summarized most of the fundamental facts and principles of modern biology and described briefly the behavior of the lower animal." He has given "some of the most important facts and principles of neurology" and covered "the whole field of psychology in a concise fashion." The book ends with chapters devoted to social evolution and the factors concerned in social development. The genetic nature of the treatment is maintained throughout, the general form of society being traced from the insect society through those of the lower vertebrates to man. We are informed that a genetic method such as is described in the book must be adopted by psychologists before their discipline can become a full-fledged science. In the part devoted to psychology the author is consistent with his definition of behavior, which includes mental or subjectively observed behavior. This section deals with instincts and their neural basis, the nature of intelligence, consciousness and personality. The author has aimed to make the book useful as a text-book in comparative psychology and in biological and epistemological sociology. There is a partial bibliography covering ten pages.

Three books have appeared on evolution. Semi Meyer's (11) treatment of the development of mind is philosophical and epistemological. It is not genetic in the sense that the development is along

¹ Reviewed by F. L. Wells in the BULLETIN for July, 1913, pp. 280-281.

anthropological and biological lines. It is rather a synthesis of the mind as such with no excursions outside of the purely mental. Meyer does not believe in evolutionary continuity. The reader is told that to approach the book without prejudice he must be convinced of one fact, "Dass in der Welt wirklich etwas entstehen kann," that is, something non-derivable from previous evolutionary stages. Among the subjects treated are the influences of memory, instinct and practice upon the development of the mind, the growth of the will and its nature as a motive form, consciousness of objects, and the space and time problems. Concerning the last named topic, it is dogmatically stated that the time sense is a strictly human possession. The author's own conclusions are not always clear, but he reminds the reader that problems and not solutions are here unrolled.

The opposite point of view in regard to evolution is taken by Ingenieros (7) in his discussion of the principles and methods of biological psychology. For him the evolutionary process is a continuous one. Thought processes are infinite. They differ not in essence but in grade. They are progressive stages in a continuous science and should be studied phylogenetically. One may also say there is a continuity between sensation, images, judgments and those higher thought processes which are the foundations of ideals. To understand the mental functions which constitute the personality of an individual one must consider both inherited tendencies or temperament and the effects of education and environment on habit formation. Introspection and experimentation are only auxiliary to such a genetic biological investigation as is advocated by the author. His treatment of his subject is most general and though he defends his views at some length, they contain, on the whole, little originality.

Schmucker¹ (18) has written a popular account of evolution which as he says is "an attempt . . . to give to people whose training is other than scientific some conception of this great story of creation." In simple language the underlying idea of evolution, together with a history of this concept before and during the time of Darwin and Wallace, is given. Numerous illustrations are employed from animal life to show the manner of development, the horse being used as a special example for more complete treatment. The account ends with present theories such as the mutation theory of de Vries and a forecast of future development. The psychologist will notice the absence of a treatment of mental development. The book may be used as a first orientation to the problem.

¹ Reviewed by H. E. Walter, *Science*, 1913, 38, 779.

Of more general nature are the books by Campbell (4) and Carus (5). Believing that psychologists have never had the ability to analyze the human mind itself, Campbell in his little book has attempted to do so for us. He wishes to prove his mechanistic doctrine but becomes so entangled in epistemological problems that it is impossible to follow him. Carus in his monograph on mechanical and non-mechanical principles of life defines his position as one between the mechanistic scientist and the teleological thinker. The natural laws are the thoughts of God. The laws of form determine the uniformity of nature. Furthermore these laws and the machine are one. More than half of this little book is devoted to extracts from other authors, principally from the philosophies of Mark Twain and La Mettrie.

Space does not permit a detailed account of the long paper by Stearns on the psychological methods of mental examination, the paper by Marbe upon the relation of psychology to the other sciences and practical life, and of the descriptions of the forty-five papers read before the Fifth Congress of Experimental Psychology, all of which are contained in a report of the meeting edited by Schumann¹ (19). This biennial report is of inestimable value to those psychologists who wish to keep in touch with the latest activities of the German psychologists. In fact it is a book few experimentalists can afford to be without. Besides the report there is also a very useful account of the instruments displayed and a catalogue of the exhibition of the Institute of Applied Psychology.

Three conventional text-books may be mentioned. The eighth and ninth installments of Dürr's continuation of Ebbinghaus's *Psychology*² (6) have appeared, thus completing the second volume. They deal largely with problems of esthetics. The many sides of the problem of speech are also thoroughly considered.

Although Major (10) has not adopted a system for his text-book in that his treatment is at times functional and at other times structural, yet on the whole the book is built on conventional lines. He remarks that his chief sources are James and Titchener. The latter is very copiously quoted and in arrangement of topics is followed closely by the author. Among the differences may be mentioned the presentation of many sketches of the nervous system and the omission

¹ The several papers will undoubtedly be described in the different summaries appearing in the BULLETIN throughout the year. It is mentioned here merely to call attention to this valuable collection as a whole.

² The two volumes will be reviewed as a whole by Professor F. P. Boswell in a subsequent number of the BULLETIN.

of theoretical discussions. There is also practically no reference to experimental investigation, the reader merely being directed to several well known text-books. The book is meant to be very elementary. The more difficult problems are avoided. It is written in an almost popular style and will no doubt be appreciated by the immature pupil.

Magnusson's (9) book is an attempt to present the psychological facts which are essential to education and to show how they are applicable. It is not a treatise on experimental educational psychology. Short notice is given to sensation, the main portion of the book being devoted to perception, memory, feeling, will, habit, the subconscious, etc. One is also told how to teach art, science, etc. The book is elementary in nature and lacks system and will probably not interest the laboratory psychologist.

Of books on the history of psychology Baldwin's (1) is the most important. In his two little volumes he has attempted to trace the development of the concept of self from the earliest times to the end of the nineteenth century. It is not a narration of particular facts but a sketch of the development of fundamental concepts. The history strongly reflects the individuality of the author and will be most welcome to those in sympathy with his personality and point of view.¹

Brett (3) announces in his history that the book contains other matter besides strictly psychological data in the narrow sense of the term. In the words of the author, "The nature of man is regarded as forming the center of three great lines of interest, namely, the study of human activities as a psychologist sees them, the study of human life as a doctor looks at it, and the growth of systematic belief as reflected in philosophy and religion. The union of these and their historical development seems likely to yield what might be called the autobiography of the human mind." This development is traced from primitive thought through the Greek philosophy to the doctrine of St. Augustine. Special attention is paid to Plato and Aristotle and consideration is also given to Eastern theories. To those who desire a full, well-written description of the development of theories of the soul in the speculative period of the science the book will be very welcome.

In 1897 the first edition of Piat's (14) book entitled *La personne humaine* appeared. A second revised edition has just been published. The only essential difference is the addition of a long preface in which the author states that nothing in recent years has caused him to change his fundamental views on the unity and indivisibility of the

¹ A special review will appear in an early number.

ego, his contention that the chief characteristic of human intelligence is the faculty of abstraction and his opposition to the theory of transformation and the Spencerian theory of evolution. Renouvier's (16, 15) *Les principes de la nature* and his *Psychologie rationnelle* have been reprinted without change. The form of the new edition is very satisfactory. A second corrected edition of Paulhan's (13) *L'activité mentale* and a fifth edition of MacCunn's (8) book on the educational aspects of ethics have also appeared.

REFERENCES

1. BALDWIN, J. M. *History of Psychology*. New York: G. P. Putnam's Sons, 1913. 2 vols. Pp. xii + 168; vii + 214.
2. BECHTEREW, W. *La psychologie objective*. (Translated from the Russian by N. Kostyleff.) Paris: Alcan, 1913. Pp. iii + 478.
3. BRETT, G. S. *A History of Psychology Ancient and Patriotic*. London: George Allen and Co., 1912. Pp. xx + 388.
4. CAMPBELL, P. A. *The Game of Mind. A Study in Psychological Disillusionment*. New York: The Knickerbocker Press, 1913. Pp. iii + 80.
5. CARUS, P. *The Mechanistic Principles and the Non-Mechanical*. Chicago: The Open Court Publishing Co., 1913. Pp. iv + 125.
6. EBBINGHAUS, H. *Grundzüge der Psychologie*. (Fortgeführt von Ernst Dürr. Achte und neunte Lieferung.) Leipzig: Veit and Co., 1913.
7. INGENIEROS, J. *Principios de Psicología Biológica*. Madrid: D. Jorro, Ed., 1913. Pp. 471.
8. MACCUNN, J. *The Making of Character. Some Educational Aspects of Ethics*. New York: Macmillan, 1913. Pp. vii + 226.
9. MAGNUSSON, P. M. *Psychology as Applied to Education*. Boston: Silver, Burdett and Co., 1913. Pp. ix + 345.
10. MAJOR, D. R. *The Elements of Psychology*. Columbus, O.: R. G. Adams and Co. 1913. Pp. xiii + 413.
11. MEYER, SEMI. *Probleme der Entwicklung des Geistes. Die Geistesformen*. Leipzig: Barth, 1913. Pp. iv + 429.
12. PARMELEE, M. *The Science of Human Behavior*. New York: Macmillan, 1913. Pp. vii + 443.
13. PAULHAN, FR. *L'activité mentale et les éléments de l'esprit*. 2 ed. Paris: Alcan, 1913. Pp. 586.
14. PIAT, C. *La personne humaine*. Paris: Alcan, 1913. Pp. xv + 404.
15. RENOUVIER, C. *Traité de psychologie rationnelle d'après les principes du criticisme*. 2 vols. Paris: Colin, 1912. Pp. 398, 386.
16. RENOUVIER, C. *Les principes de la nature*. Paris: Colin, 1912. Pp. lxx + 444.
17. SCHMIED-KOWARZIK, W. *Umriss einer neuen analytischen Psychologie und ihr Verhältnis zur empirischen Psychologie*. Leipzig: Barth, 1912. Pp. iv + 318.
18. SCHMUCKER, S. C. *The Meaning of Evolution*. New York: Macmillan, 1913. Pp. 298.
19. SCHUMANN, F. *Bericht über den V. Kongress für experimentelle Psychologie in Berlin vom 16. bis 20. April 1912*. Leipzig: Barth, 1912. Pp. xxv + 324.

APPARATUS

BY C. E. SEASHORE

University of Iowa

A very interesting and ingenious device for simulating the working of a nervous system is described by Russell (9) who summarizes his account of the apparatus as follows: "We have demonstrated a mechanism that will simulate in its various forms the working of nervous discharges. With it, as in a nervous system, we find that as a result of individual experience, changes take place so that with the same signals as before the responses have changed and vice versa we find the same responses when the signals have changed. We have a mechanism that can be trained, that can acquire habits, that will move either forward or back at a given signal according to experience, that will make one, two or three responses to a given signal according to experience. In other words we have shown a practical arrangement of mechanical transmitters and receivers that will respond to signals and control movements like a nervous system and that possesses associative memory as it can learn by experience. For, quoting Dr. Loeb again, 'If an animal can be trained, if it can learn, it possesses associative memory.'"

Those who are interested in the graphic recording of sounds and movements such as are found in heart action will find the improvements in the Crehore method of recording made by Dr. Austin (3) valuable. He has devised a time marker with a signal and developed methods of making simultaneous tracings, tracings from the exposed heart, and records from the heart sounds.

Psychologists who are installing equipment for the 110-volt D.C. in a laboratory will find the description given by Dr. Jackson (6) ingenious and helpful, although, as the author states, there is nothing really new about his system which consists of a resistance bank and various contrivances for distributing the current to different tables and adapting it to various needs. Martin (8) also describes an installment of this kind and makes suggestions regarding color wheels and color disks.

Hürthle (5) describes an instrument consisting of a manometer and a speed timer with accessories for the direct observation and the recording of the arterial pressure and the rate of flow of the blood.

Schackwitz (10) describes an apparatus for the recording of eye movements in reading, which consists essentially of a soft rubber

capsule which rests on the upper eyelid and is connected with a Marey tambour or a Marbe flame in such a way as to make a graphic record of the movements of the eyeball. While it is not well adapted for the recording of extent of movement, it would seem to be a simple and unobtrusive means of recording the time of the principal eye movements.

The "Komplikationsversuche" have played an important rôle in the Leipzig laboratory. We therefore welcome from this laboratory Wirth's (12) account of the new model of the "complication-apparatus" made by Zimmermann. He describes (13) one particular modification of this apparatus for use in the study of the personal equation in reactions which would seem to be a desirable permanent piece to have in a laboratory.

Ach (1, 2) describes various arrangements of apparatus for the recording of serial reactions. In the main he uses a slit disk for exposure, a membrane voice key, and a chronograph. Various alternatives are suggested such as timing the chronograph and the use of the carbon ribbon instead of smoked paper on the drum.

Dunlap (4) has devised a method of computing the mean variation with the aid of a calculating machine.

Wohlgemuth (14) has designed a "Thermophor" for the study of warmth spots and a "Crypophor" for the study of cold spots, both acting on the principle that, if two strips of metal such as copper and bismuth be soldered together so as to make a ring, heat applied at one joint will set up an electric current in the ring. The opposite joint may then be used as a stimulus point and the temperature may be registered in terms of galvanometer readings.

The color-triangle described by Luckiesh (7) is made by placing a red, a green and a blue tungsten lamp into the three corners of a triangular case with ground glass face. This face is said to display the actual colors in their various combinations.

Urban's (11) audiometer rests on the principle that the strength of the tone emitted by a fork may be varied by turning the fork. The sounding fork is driven tandem with an interrupting fork and the amplitude of vibrations is measured by a pointer on the prong. The apparatus is built by Zimmermann.

REFERENCES

1. Ach, N. *Eine Serienmethode für Reaktionsversuche. II: Bemerkung zur Untersuchung des Willens.* (Untersuch. z. Psychol. u. Phil. hrsg. v. Ach, N. 1. Bd. 5. H.) Leipzig: Quelle & Meyer, 1912. Pp. v + 49.
2. Ach, N. *Ueber eine Serienmethode für Reaktionsversuche nebst Demonstration des*

Chronoskop-Chronographen. (Ber. über d. V. Kongress f. exper. Psychol.) Leipzig: Barth, 1912. Pp. 133-135.

- 3. AUSTIN, J. H. Some applications of the Crehore micrograph, with especial reference to the recording of heart sounds. *Amer. J. of Med. Sci.*, 1912, 143, 193-198.
- 4. DUNLAP, K. Obtaining the mean variation with the aid of a calculating machine. *Psychol. Rev.*, 1913, 20, 154-157.
- 5. HÜRTHLE, K. Beschreibung einer Vorrichtung zur optischen Registrierung von Druck und Stromstärke. *PFLÜGER's Arch. f. d. ges. Physiol.*, 1912, 147, 509-524.
- 6. JACKSON, D. E. A system of electric wiring for using direct street current in laboratories. *J. of Amer. Med. Assoc.*, 1912, 58, 1011-1012.
- 7. LUCKIESH, M. A color-triangle for lecture purposes. *Psychol. Rev.*, 1913, 20, 254.
- 8. MARTIN, L. J. The electrical supply, and certain new additions to the laboratory equipment, in the Stanford University psychological laboratory. *Amer. J. of Psychol.*, 1913, 24, 33-34.
- 9. RUSSELL, S. B. A practical device to simulate the working of nervous discharges. *J. of Animal Behav.*, 1913, 3, 15-35.
- 10. SCHACKWITZ, A. Apparat zur Aufzeichnung der Augenbewegungen beim zusammenhängenden Lesen (Nystagmograph). *Zsch. f. Psychol.*, 1913, 63, 442-453.
- 11. URBAN, F. M. Ein Apparat zur Erzeugung schwacher Schallreize. *Arch. f. d. ges. Psychol.*, 1913, 27, 232-234.
- 12. WIRTH, W. Ein Demonstrationapparat für Komplikationsversuche. *Psychol. Stud.*, 1913, 48, 474-483.
- 13. WIRTH, W. *Die Kontrolle der Reaktionsweise.* (Ber. über d. V. Kongress f. exper. Psychol.) Leipzig: Barth, 1912. Pp. 144-148.
- 14. WOHLGEMUTH, A. Zwei neue Apparate zur Untersuchung des Temperatursinnes der Haut. *Zsch. f. Sinnesphysiol.*, 1913, 47, 412-419.

SPECIAL REVIEWS

Outline of a Study of the Self. R. M. YERKES and D. W. LA RUE.
Harvard University Press, 1913.

By this *Outline* Professors Yerkes and La Rue furnish both incentive and guide to that scientific study of self which Stern has named psychography. The *Outline* is in fact a set of detailed directions to be followed by individual students in constructing such autobiographies. "The purpose of the study" the authors say, "is three-fold: to help you to understand yourself . . . ; to help you to understand . . . other persons . . . ; to arouse your interest in the facts of heredity and environmental influence. . . ." The scope of the work is best indicated by a summary of its contents.

I. "The Ancestral History of the Self" is to include a family tree, a "record of family traits" following the schedule of the Eugenics Record Office of Cold Spring Harbor (which is given), and a "description of the environment and of the physical, mental, moral and social characteristics which seem to have determined the success and happiness" of great grandparents, grandparents and parents.

II. The second section on "the development or growth of the self" suggests headings for an account of (1) the "conditions of prenatal life," (2) "the self in infancy," (3) "the self in childhood" and (4) "the self in adolescence." Under the second and third of these topics the following points are stressed: (a) "Environmental influences; (b) physical development; (c) mental development; (d) temperament and character; (e) vocational suggestions; (f) habits of special importance; (g) social relations and tendencies."

III. The account of the self of to-day is to "exhibit it (1) as an expression of heredity . . . , (2) as moulded by environment . . . , (3) as a functioning organism, influenced by and influencing the world—animate and inanimate."

IV. In the final section, the writer of the scientific autobiography which is here outlined is to consider "the significance [(1) vocational, (2) marital, and (3) social] of the characteristics of the self." In other words, he is to consider the results of this study of his ancestry, his environment, and his own endowment and acquirements in

their bearing on the problems (1) of his vocation; (2) "of congeniality in wedlock and the welfare of offspring"; and (3) of his duties as a member of social groups.

Under each of the headings of this summary the authors suggest specific questions and topics of which the following are selected at random, as examples only: "(The Self in Childhood) (a) Was your childhood spent in the country or city? (b) What relation has your weight usually borne to your height? (c) When did you enter school? . . . Could you best remember the exact words or the general ideas of a lesson? (d) Did you consider yourself a 'good' or a 'bad' child in comparison with your mates? (e) What was your childhood attitude toward your father's vocation? Why? III. (The Self in Adolescence) . . . (c) The following outline is suggested in studying your mental development: Sensations: discrimination, range. Imagery: type and effectiveness. Chief likes and dislikes: food, persons, clothing, natural phenomena, *etc.* Apperceptive tendencies. . . . Memory. . . . Thought: concepts most readily formed; judgment; best in what direction? Reasoning: were you logical, broad-minded, fair? Emotions: which kind strongest? Were they quick or sluggish? Did they over-influence your reason? Sentiments. . . . Will: greatest strength and weakness; far-visioned or immediate? Obstinate or conciliatory? IV. (The Significance of the Characters of the Self. Social) (a) What bearing has your physique upon your social duties? (b) Are your morals strictly personal, or do you consider them applicable to every human being?"

The writer of this review limits herself to two general comments. It seems unlikely, in the first place, that many people will be found with the combination of leisure, capacity and inclination necessary for so complete a study of self. But every student would be benefited by the understanding, to be gained through this outline, of what such a study involves; and parts of the work might profitably be undertaken without attempting the whole.

In the second place, the reviewer wishes to call attention to the fact that only a psychology treated in the way in which Yerkes and La Rue treat it, as a science of self in relation to environment, could ally itself in this fruitful fashion with biology and sociology.

MARY WHITON CALKINS

WELLESLEY COLLEGE

COMMUNICATIONS

AN HISTORICAL NOTE

TO THE EDITOR OF THE PSYCHOLOGICAL BULLETIN:

There was at one time a very lively discussion whether or not psychical states, especially sensations, are quantities. The discussion arose about Fechner's assertion that sensations are measurable magnitudes, or quantities, *i. e.*, the sums of certain numbers or sensation-units, a proposition which is fundamental for his doctrine. At present the consensus of opinion seems to be that the negative side, represented by Delboeuf, Tannery and J. v. Kries, carries the day and that Fechner is wrong. A very interesting and exhaustive presentation of this controversy is given in Titchener's *Manual*, Vol. II., Pt. II., pp. 48-68 of the Introduction. It may be remarked that the question is mainly one of historical interest, since psychophysics of the present day does not make any such assumption.

It is a curious and interesting fact that the whole controversy was anticipated several years before the *Elemente* appeared in print. The following lines contain a translation from A.-A. Cournot, *Essai sur les fondements de nos connaissances et sur les caractères de la critique philosophique*, which was published in 1851. Cournot says that writing this book took him ten years and that the first plan was made twenty years before its completion. He, therefore, was some thirty years prior to Delboeuf and Tannery, and Fechner could have found a complete refutation of his system, had he but known the *Essai sur les fondements de nos connaissances*. However, considering the stubborn fight which Fechner put up, it is not at all likely that he would have surrendered to the arguments of Cournot. Neither may we blame him for not knowing the writings of the French philosopher, whose high position in the government service militated against the success of his ideas, for there is no sign that Delboeuf and Tannery appreciated the argument of their fellow countryman. This is a sign of the unmerited oblivion which was the lot of the ideas of this deep thinker.

(P. 396) "According to the popular definition everything capable of increase and decrease is called a quantity. There are, however,

many things which may be increased and diminished, and even increased and diminished continuously, that, nevertheless, are not magnitudes and, therefore, not quantities. A painful or a pleasant sensation may increase or diminish or go through different stages of intensity without a sudden transition from one phase to the other, so that one can not fix the precise moment when it comes into consciousness or disappears therefrom. This is the way in which things doubtlessly take place in a great number of cases. When in other cases a pain seems to begin or end abruptly, to increase or diminish in jumps, we may reasonably believe that this discontinuity is apparent only (as in the case of an impact which suddenly changes the motion of a body), and that the phenomena are always continuous, although we identify different phases, their succession escaping us owing to the imperfections of the inner sense which we call psychological consciousness. *The sensations of pleasure and pain, however, and the mathematical notions of magnitude have nothing in common. One can not say that a more intense pain is the sum of several fainter ones.* Although a sensation frequently goes in continuous steps from pleasure to pain, or inversely from pain to pleasure, thereby passing through a neutral state (what in several respects may be called the vanishing of certain magnitudes when passing from positive to negative values) (p. 397) *one can not regard such a neutral state as resulting from the summation of pains and pleasures which balance.*

“By the study of anatomy and physiology we succeed in understanding how a continuous variation in the intensity of a pleasant or a painful sensation may be related to the continuous variation of certain measurable magnitudes and depend on the inherent continuity of time and space. For we understand that the bigger a tract of nervous fibres is (taking into account for the determination of the cross-section the sections of elementary nerve-fibres only, disregarding the tissues which surround and protect them), the more painful is the sensation produced by straining the tract. Other conditions remaining constant, there is for every size of the area of the cross-section a certain corresponding painful sensation, *but this correspondence has not the character of a mathematical relation for although the area of the cross-section is a measurable magnitude, sensation is not.*

“If you put your hand in water of forty degrees and leave it there a sufficient length of time, although the temperature of the water does not change, your first sudden sensation of heat gradually and without leaps grows fainter so that one can not assign any particular moment when it disappears. Other conditions being equal, the

intensity of the sensation depends on the time elapsing since the immersion of the hand, and (p. 398) the continuity of time explains sufficiently the continuity of the variations in the sensation produced. This sensation, however, is not a measurable magnitude which by reference to a unit could be expressed numerically.

"Since the vibration-rate of a sounding body or of the ether is a measurable and continuous magnitude, we understand that passing from one tune to another, or from one color to another color should be continuous, but this is no reason for the existence of assignable numerical relations between the sensations of sound and of color, such as exist between the corresponding vibration-rates. *The sensation of the note SOL is not equivalent to one and a half times the sensation of UT, merely because the vibration-rate of SOL is one and one-half that of UT. Nor is the sensation of orange five-sevenths or any other fraction of the sensation of violet, because the vibration-rate of ether for orange light is about five-sevenths of that for violet rays.*

"Continuity in the variations of the intensity of attention or of sexual desire may be explained by continuity in the variations of certain physical quantities, as for instance the velocity or oversupply of blood, the electrical charges or the temperature of certain organs which have, or may have, an immediate influence on other vital forces. From this one must not conclude, however, that the attribute of being a measurable quantity belongs to these vital forces or to the phenomena determined by them."

The circumstance that Cournot uses the term "sensation of pain," where most writers of his period would have said feeling of pain, makes this passage sound quite modern. As a matter of fact there is very little that could be added to his argument, which is as precise as one could wish.

F. M. URBAN

UNIVERSITY OF PENNSYLVANIA

ANNOUNCEMENT

A prize of One Hundred Dollars (\$100.00) is offered for the best paper on the Availability of Pearson's Formulae for Psychophysics.

The rules for the solution of this problem have been formulated in general terms by William Brown. It is now required (1) to make their formulation specific, and (2) to show how they work out in actual practice. This means that the writer must show the steps to be taken, in the treatment of a complete set of data (*Vollreihe*), for the attainment in every case of a definite result. The calculations should be arranged with a view to practical application, *i. e.*, so that the amount of computation is reduced to a minimum. If the labor of computation can be reduced by new tables, this fact should be pointed out.

The paper must contain samples of numerical calculation; but it is not necessary that the writer have experimental data of his own. In default of new data, those of F. M. Urban's experiments on lifted weights (all seven observers) or those of H. Keller's acoumetrical experiments (all results of one observer in both time-orders) are to be used.

Papers in competition for this prize will be received, not later than December 31, 1914, by Professor E. B. Titchener, Cornell Heights, Ithaca, N. Y., U. S. A. Such papers are to be marked only with a motto, and are to be accompanied by a sealed envelope, marked with the same motto, and containing the name and address of the writer. The prize will be awarded by a committee consisting of Professors William Brown, E. B. Titchener, and F. M. Urban.

The committee will make known the name of the successful competitor on July 1, 1915. The unsuccessful papers, with the corresponding envelopes, will be destroyed (unless called for by their authors) six months after the publication of the award.

BOOKS RECEIVED

GAULTIER, PAUL. *Les maladies sociales.* Paris: Hachette, 1913. Pp. vi+268. 3 fr. 50.

FINNBOGASON, GUDMUNDUR. *L'intelligence sympathique.* (Traduit par André Courmont.) Paris: Alcan, 1913. Pp. 244.

CALDWELL, W. *Pragmatism and Idealism.* London: Black; New York: Macmillan, 1913. Pp. ix+268. \$2.00.

ALEXANDRE-BISSON, JULIETTE. *Les Phénomènes dits de matérialisation.* Paris: Alcan, 1914. Pp. xx+312. 12 fr.

PYLE, W. H. *The Examination of School Children.* New York: Macmillan, 1913. Pp. 70. \$0.50.

GEMELLI, AGOSTINO. *Il metodo degli equivalenti. Contributo allo studio dei processi di confronto.* Firenze: Libreria Editrice Fiorentina, 1914. Pp. 344.

JOHNSON, H. M. *Audition and Habit Formation in the Dog.* (No. 8 of Behavior Monographs.) New York: Henry Holt and Co., 1913. Pp. 78.

NOTES AND NEWS

AT the recent meeting of the American Psychological Association at New Haven Professor R. S. Woodworth (Columbia) was elected president for the coming year. Professors S. I. Franz and G. M. Whipple were elected to membership on the Council. Professor R. M. Ogden (Tennessee) was made secretary-treasurer for three years.

THE Southern Society for Philosophy and Psychology has elected the following officers for the year 1914: president, Professor J. B. Watson (Johns Hopkins); vice-president, Dr. Josiah Morse (South Carolina). Professor W. C. Ruediger (George Washington) continues as secretary-treasurer.

THE American Philosophical Association has elected Professor J. H. Tufts (Chicago) president and Professor W. H. Sheldon (Dartmouth) vice-president. Professor E. G. Spaulding (Princeton) continues as secretary.

